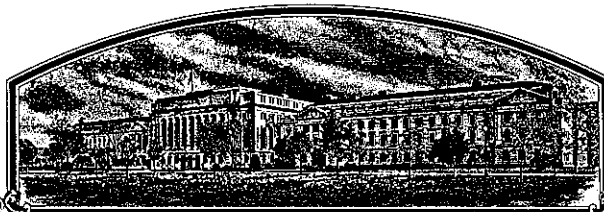


No.

8500096



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Ohio State University  
Ohio Agricultural Research & Development Center

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'Adena'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this *11th* day of *March* in the year of our Lord one thousand nine hundred and eighty-eight.

Attest

*Kenneth H. Ward*  
Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*Richard E. Lyng*  
Secretary of Agriculture



U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
WAREHOUSE & SEED DIVISION

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

## APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

1. NAME OF APPLICANT(S) Ohio State University, Ohio Agricultural Research and Development Center		2. TEMPORARY DESIGNATION OH 188	3. VARIETY NAME Adena
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) 1680 Madison Avenue Wooster, OH 44691		5. PHONE (Include area code) 216-263-3700	FOR OFFICIAL USE ONLY PVPO NUMBER 8500096
6. GENUS AND SPECIES NAME Triticum aestivum L.	7. FAMILY NAME (Botanical) Graminae		FILING DATE 3/27/85 TIME 2:30 <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M.
8. KIND NAME Soft Red Winter Wheat	9. DATE OF DETERMINATION 8/20/82		FEES RECEIVED AMOUNT FOR FILING \$ 1,800 DATE 3/27/85 AMOUNT FOR CERTIFICATE \$ 200.00 DATE January 19, 1988
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Agricultural Experiment Station			12. DATE OF INCORPORATION
11. IF INCORPORATED, GIVE STATE OF INCORPORATION			

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Dr. H. N. Lafever Agronomy Department Ohio Agricultural Research and Development Center Wooster, OH 44691 PHONE (Include area code): 216-263-3886	
---	--

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED	
a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)	c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of the Variety (Request form from Plant Variety Protection Office.)
b. <input checked="" type="checkbox"/> Exhibit B, Novelty Statement	d. <input checked="" type="checkbox"/> Exhibit D, Additional Description of the Variety

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.)	
<input checked="" type="checkbox"/> Yes (If "Yes," answer items 16 and 17 below)	<input type="checkbox"/> No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?	17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Foundation <input type="checkbox"/> Registered <input checked="" type="checkbox"/> Certified

18. DID THE APPLICANT(S) FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
<input type="checkbox"/> Yes (If "Yes," give date)
<input checked="" type="checkbox"/> No

19. HAS THE VARIETY BEEN OFFERED FOR SALE OR MARKETING IN THE U.S. OR OTHER COUNTRIES?
<input checked="" type="checkbox"/> Yes (If "Yes," give names of countries and dates)
<input type="checkbox"/> No

U.S. (Sept., 1984)

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.
---

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT Howard N. Lafever (Breeder)	DATE 2/1/85
SIGNATURE OF APPLICANT Fred L. Jones, acting director	DATE 2/1/85 1

Exhibit AOrigin and Breeding History of the Variety

1. Adena (previously designated OH 188) originated at the Ohio State University-Ohio Agricultural Research and Development Center from the cross S227/Logan-F<sub>2</sub>//Blueboy/3/Logan. S227 is an unreleased sister line of the Indian variety Kalyan Sona with multi-floret tendencies. The final cross was made in 1970 and was designated 2370. Adena was first selected as an individual plant in the F<sub>2</sub> generation, reselected as a single plant in the F<sub>3</sub> generation before the final selection in the F<sub>7</sub> generation described below. The pedigree 2370B2-10-2 was used to designate this line in early tests until it was assigned the designation "OH 188" in 1977.
2. Breeder seed of Adena consists of a bulk of the progeny of 23 uniform, phenotypically identical plants selected in the F<sub>7</sub> generation in 1977. Progeny growouts of these 23 plants appeared phenotypically identical and homozygous in the F<sub>8</sub>, F<sub>9</sub>, F<sub>10</sub>, F<sub>11</sub>, and F<sub>12</sub> generations before they were bulked at harvest in 1982 as seed from F<sub>12</sub> plants. The first distribution of Foundation generation seed was made in the fall of 1984 to producers of Certified seed.
3. Adena appears to be very uniform and homogenous as observed in the field for the past 6 seasons. This would be expected as the progeny of phenotypically identical plants selected in F<sub>7</sub> and reexamined for uniformity in F<sub>8</sub> through F<sub>12</sub>. (Fifty F<sub>7</sub> selections were originally made with the progeny of only 23 of these judged identical enough to bulk for constitution of Breeder Seed.)
4. Adena appears to be very stable and true breeding as evidenced by thorough agronomic and pathological examination of the F<sub>8</sub> through F<sub>12</sub> generations in special purification and increase nurseries.
5. ~~Variants observed during the development of this variety were few in number and of various, non-repeating phenotypes with one exception: In the last two generations (F<sub>13</sub> and F<sub>14</sub>) observed in 1983 and 1984, up to .4% repeating phenotype deviants were observed. These were taller plants with small, tapered, awnless, heads possessing yellow anthers.~~

Other variants observed generally appeared to be the result of admixtures or outcrosses and they were rogued or rows obtaining such types were omitted during the purification and increase process in F<sub>8</sub> through F<sub>12</sub> generations. Roguing of all observed off types was performed three times each in the bulked Breeder seed increase of 1983 (F<sub>13</sub>) and the Foundation generation increase of 1984 (F<sub>14</sub>).

Since Adena is the shortest of all currently grown varieties in Ohio, any admixtures or outcrosses are usually easily observed and can be rogued.

# AMENDMENT TO EXHIBIT A, PARAGRAPH 5



The Ohio State University  
Ohio Agricultural Research  
and Development Center

Department of Agronomy  
Wooster, Ohio 44691-6900  
Phone (216) 263-3878

August 2, 1985

Dr. Kenneth H. Evans, Commissioner  
Plant Variety Protection Office  
AMS/USDA  
National Agricultural Library Bldg  
Beltsville, MD 20705

Dear Ken:

During this past growing season I had the opportunity to inspect several fields of Adena soft red winter wheat. In the course of these inspections it became evident that a phenotypic deviation exists in this variety that was not previously observed, thus, I am hereby requesting an amendment be added to Exhibit A; paragraph 5 of our Application for Plant Variety Certificate (PV #8500096, Wheat) to read as follows:

5. Variants observed during the development of this variety were few in number and of various, non-repeating phenotypes with the following exceptions: In the last generation (F<sub>15</sub>) observed in 1985, up to .8% repeating phenotype deviants were observed. These were plants occasionally taller with small, tapered awnless heads possessing yellow anthers at anthesis, however, if observed later they differed primarily in maturity only by being a few days later in ripening.

Thank you for your consideration. If additional paperwork is needed to record this amended description, please inform me.

Sincerely yours,

A handwritten signature in cursive script that reads 'Howard N. Lafever'.

Howard N. Lafever  
Professor

HNL/lz

6. Criteria for selection during multiplication (F<sub>8</sub>-F<sub>11</sub>) allowed no variance from complete uniformity. If one off type plant was observed in a 10' row, that plant was either rogued or the row dropped from further increase. If two or more off type plants were observed in a row, the row was eliminated from further increase. The 23 remaining line descendants of selected F<sub>7</sub> plants were space planted in separate plots in the F<sub>12</sub> generation and examined carefully for uniformity. Very few questionable (off-type) plants were observed in these plots.

The variety was selected primarily for high yielding ability, extreme short stature, high straw strength, high wheat spindle streak mosaic (WSSM) resistance and acceptable milling and baking quality. The variety was selected in comparison to popular varieties in Ohio; primarily Abe, Arthur, Logan, Ruler, and Roland.

Exhibit BNovelty Statement and Botanical Description of the Variety

Adena is an extremely short, midseason maturity variety of soft red winter wheat with blue green foliage. Straw is stiff and erect. At maturity the head is only slightly nodding. At heading the flag leaf is recurved. Winterhardiness under Ohio conditions is excellent. Late fall and early spring growth habit is mostly prostrate, but the variety exhibits rapid reinitiation of regrowth in the spring and the transition from prostrate to upright juvenile growth habit is rapid. Leaves are mid-wide and mid-long compared to other standard midwestern soft red winter wheats such as Arthur, Ruler and Logan.

Adena is moderately sensitive to acid soil conditions, has exhibited excellent resistance to scab (Fusarium) and is resistant to field infections of loose smut (Ustilago tritici). It has only fair resistance to leaf rust (Puccinia recondita f. sp. tritici) and powdery mildew (Erysiphe graminis f. sp. tritici). Adena also appears susceptible to the PAV strain of barley yellow dwarf virus (BYDV). Adena possesses near immunity to wheat spindle streak mosaic virus (WSSMV), better than any other observed variety. Other pathogens have not occurred in Ohio frequently enough to accurately document the response of Adena to them. (See exhibit C, item 18)

Adena possesses the H<sub>7</sub> and H<sub>8</sub> genes for Hessian fly resistance.

Adena heads three days earlier than Ruler and two days later than Arthur under Ohio conditions. Heads are fusiform, mid-dense with yellow anthers and square to oblique glume shoulders. Heads are apically awnletted with tip awns 2-3 cm in length.

Adena most closely resembles Ruler, however, its height averages 12.7 cm shorter than Ruler and it is 3 days earlier. Phenol reaction of Adena is fawn while Ruler exhibits a brown reaction. Tip awns of Adena are usually about 1 cm longer than Ruler. Early coleoptile color of Adena is normally purple while Ruler exhibits nearly white coleoptile color, however, seedling anthocyanin colors are reversed.

Ohio State University  
Ohio Agricultural Research and Development Center  
Wooster, Ohio

RELEASE OF ADENA (P.I. 481852) SOFT RED WINTER WHEAT

The Ohio State University, Ohio Agricultural Research and Development Center announces the release of 'Adena', a soft red winter wheat (Triticum aestivum L.) cultivar.

Adena was designated OH 188 during testing and development. Adena originated from the cross S227/Logan-F<sub>2</sub>//Blueboy/3/Logan. Breeder seed consists of a bulk of the progeny of 23 plants selected for uniformity in the F<sub>7</sub> generation in 1977. Adena was first selected as an individual plant in the F<sub>2</sub> generation and reselected as a single plant in the F<sub>3</sub> before the final reselection in F<sub>7</sub>.

Application will be made for Plant Variety Protection under the seed certification option for Adena. Due to its extremely short height, outcrosses and seed mixtures are more easily observed in Adena than in other certified varieties, thus its production will be limited to two generations only (Foundation and Certified) beyond breeder seed.

Adena has been tested in state-wide Ohio yield trials since 1978 and in the Uniform Eastern Soft Red Winter Wheat Nursery in 1980, 1981, and 1982. Yields and other agronomic data are given in Tables 1-5. Adena appears essentially equal to Titan and Hart, the two most widely grown cultivars in Ohio, in yield potential in Ohio tests and, in addition, exceeds each of these varieties in several other desirable agronomic or disease characteristics.

Test weight of Adena is classed as medium; being slightly higher than Titan and equal to Roland.

Adena has an average heading date four days earlier than Titan and Logan; equal to Hart and two days later than Arthur.

Plant height of Adena has averaged 33 inches in 37 tests over 6 years in Ohio and is the shortest variety ever tested in our program. Adena has averaged 6 inches shorter than Titan and three inches shorter than Hart and Arthur. Straw strength is not different from most currently grown varieties, however, it is superior to Arthur, Arthur 71, and Abe.

Winter survival of Adena has been excellent, especially in 1984 where considerable winter kill resulted on several varieties in western Ohio tests.

Adena is moderately sensitive to acid soil conditions; being about equal to Hart, Arthur and Abe and much less tolerant than Titan, Logan, and Ruler.

Adena has only fair resistance to leaf rust and powdery mildew in Ohio tests. It possesses excellent resistance/tolerance to wheat spindle streak mosaic virus, has exhibited excellent scab resistance and is resistant to

loose smut. 1983 observations indicate it is moderately susceptible to barley yellow dwarf virus. Adena possesses the H7 and H8 genes for Hessian fly resistance.

In tests conducted by the Soft Wheat Quality Laboratory, Wooster, Ohio, Adena has shown excellent milling and baking quality over several years, exceeding almost all currently grown cultivars in quality.

Adena has dark green foliage, usually begins regrowth earlier in the spring than other Ohio-developed cultivars and attains an upright growth habit rapidly. It has moderately large, awnless, fusiform heads held erect at maturity with white chaff and yellow straw color at maturity.

Breeder seed of Adena was used to seed approximately 120 acres in 1983 by Ohio Foundation Seeds, Inc., thus, Foundation generation seed distribution will be made following 1984 harvest. Breeder seed will be maintained by the Ohio State University, Ohio Agricultural Research and Development Center.

Release of information to the general public regarding the name, release, or description of Adena may be made at any time.

*Clive W. Donohoe Jr*

Director  
Ohio State University  
Ohio Agricultural Research and Development Center



Table 1. Comparative yields (bu/A) of Adena and other wheat varieties, by years, Ohio.

Variety	1978 3 Tests	1979 6 Tests	1980 7 Tests	1981 7 Tests	1982 7 Tests	1983 7 Tests	Average 30 location-years ( '83 not included)
Abe	57.0	49.0	51.5	42.5	53.8	--	50.0
Arthur	61.9	50.3	49.6	41.8	57.8	--	51.1
Caldwell	--	--	--	--	59.0	--	--
Hart	62.9	56.0	60.0	52.1	62.5	57.7	58.2
Logan	57.1	50.8	54.9	43.6	59.1	--	52.7
Roland	61.2	53.9	54.8	46.6	58.8	--	54.3
Ruler	52.5	53.7	56.2	43.7	56.2	--	52.4
S-76	63.2	55.7	63.5	50.3	62.5	--	58.6
Titan	62.0	59.1	62.4	47.9	61.1	60.1	58.0
Adena	55.5	61.6	59.7	46.9	58.8	58.1	56.5

Table 2. Comparative yields (bu/A) of Adena and other wheat varieties, by locations, Ohio. (1983 data not included in table.)

Variety	OARDC 1978-82	N.W.Br. 1978-82	W.Br. 1978-82	Mah.Co. 1979-82	S.Br. 1979-82	OFS 1979-82	Veg. Cr. Br. 1980-82	Average 30 location years
Abe	48.8	65.2	56.6	42.0	43.7	35.1	54.7	50.0
Arthur	51.4	64.5	57.7	41.6	43.8	36.9	58.8	51.1
Hart	60.3	71.8	61.3	51.8	53.3	43.3	62.2	58.2
Logan	53.5	66.0	57.9	46.4	43.8	42.8	53.5	52.7
Roland	55.0	70.8	58.2	48.6	46.5	37.3	59.8	54.3
Ruler	51.3	64.4	55.0	51.3	46.4	43.1	51.7	52.4
S-76	60.6	71.2	63.0	53.4	47.0	44.2	68.2	58.6
Titan	61.0	71.7	60.2	53.5	51.5	44.2	60.1	58.0
Adena	60.1	70.5	57.1	51.2	46.9	46.7	58.7	56.5

Adena outyielded Titan in 16 of 37 tests (significantly (.05) in 3 of these 16).

Adena equaled Titan in 2 of 23 tests.

Adena was outyielded by Titan in 19 of 37 tests (significantly (.05) in 6 of these 19).

Table 3. Comparative performance of Adena and other varieties in Ohio drilled plot trials, 1978-82. (Average of 30 tests), and in 7 tests, 1983.

Variety	Winter Survival			Pl. Height		Date Headed		% Lodged		Test Wt.	
	'78-'82	'83	'84 <sup>1</sup>	'78-'82	'83	'78-'82	'83	'78-'82	'83	'78-'82	'83
				(in.)						(lb/bu)	
						(May)					
Abe	96			34		25		11		58.2	
Arthur	97			36		24		14		58.2	
Hart	97	100	86	36	40	26	5/30	4	4	57.6	58.2
Logan	97			42		30		8		58.2	
Roland	96			34		26		4		56.7	
Ruler	97			38		29		7		58.0	
S-76	98			36		27		2		58.1	
Titan	97	100	71	39	41	30	6/4	9	21	56.3	57.7
Adena	97	100	90	33	34	26	5/31	6	12	56.6	57.4

<sup>1</sup> 6 tests in 1984.

Table 4. Comparative disease, insect, and aluminum tolerance ratings of Adena and other varieties in miscellaneous Ohio tests.

Variety	% Mildew	WSSM <sup>1</sup>	Leaf Rust		% Scab	Take-all <sup>1</sup>	Al. Tolerance	
	7 Tests- 6 Yrs.	9 Tests- 5 Yrs.	3 Tests G.H. <sup>1</sup>	6 Tests-3 Yrs Field-%			Av. Ratio <sup>2</sup>	Av. Score <sup>1</sup>
Abe	37	4.8	4.4	8	17	6	.67	6.6
Arthur	33	5.2	6.4	6	3	6	.41	6.8
Hart	65	1.0	6.8	14	8	2	.52	6.2
Logan	58	1.8	7.6	8	3	4	.96	3.8
Roland	34	5.1	4.9	3	4	4	.80	5.0
Ruler	56	1.7	5.9	7	.5	3	.79	4.2
S-76	60	.7	7.1	9	6	3	.33	6.4
Titan	30	2.8	7.9	7	3	3	.76	3.8
Adena	46	.7	6.1	16	1	3	.51	6.8

<sup>1</sup> 0 = none to 9 = severe damage.<sup>2</sup> Yield on acid soil ÷ yield on pH neutral soil.

Table 5. Results of state-wide drilled plot yield trials including Ohio advanced wheat lines, 1984.  
(In order by average yield in 6 tests.)

Entry	Yield (Bu/A)											
	OARDC (Wooster)	N. Western Br.	Western Br. (S. Charleston)	Mahoning Co. Farm (Canfield)	Veg. Crops Br. (Fremont)	Southern Br. (Ripley)	Avg. Yield 6 Tests	Avg. Yield 5 Tests	Avg. Date Headed	Avg. Pl. Ht. (in.)	Avg. % Lodged	Avg. Test Wt. (lb/bu)
OH 244	74.5	79.0	24.7	56.1	92.7	54.0	63.5	71.3	6/3	33	1	58.6
OH 265	67.0	73.5	32.2	50.7	89.7	51.5	60.8	66.5	6/2	33	0	59.3
OH 262	70.0	75.8	27.1	51.6	90.3	47.3	60.4	67.0	6/2	31	2	58.0
OH 286	68.0	74.3	28.4	50.3	85.0	53.3	59.9	66.2	6/3	31	2	57.4
OH 257	62.1	72.4	25.9	50.2	93.2	57.8	58.6	65.1	6/4	31	0	59.6
OH 256	67.8	65.3	19.2	58.6	87.5	49.4	58.0	65.7	5/31	30	0	57.7
Adena	67.8	74.1	21.7	46.2	84.1	52.4	57.7	64.9	6/2	31	2	57.7
Tyler	75.0	67.8	22.9	49.2	88.3	41.6	57.5	64.4	6/3	36	1	56.7
OH 234	69.9	62.9	18.6	55.2	81.9	50.3	56.5	64.0	6/3	30	0	57.8
OH 235	69.8	61.3	13.3	52.1	82.5	60.2	56.5	65.2	6/1	30	1	56.9
Hart	64.5	64.1	15.9	54.1	81.4	52.0	55.3	63.2	6/2	35	1	58.3
OH 2702	61.5	61.5	13.7	50.4	83.4	49.2	53.3	61.2	6/3	31	0	57.6
Titan	65.2	40.6	11.2	57.5	80.1	53.3	51.3	59.3	6/5	34	1	57.7
OH 285	63.3	54.0	11.9	48.7	81.5	46.6	51.0	58.8	6/2	34	1	58.4
OH 260	55.4	23.1	6.2	50.3	71.6	46.7	42.2	49.4	5/29	29	0	58.0
OH 2812	61.5	20.9	7.4	44.0	70.4	44.8	41.5	48.3	6/2	31	1	55.8
5% L.S.D.	4.3	9.8	7.0	N.S.	6.5	N.S.						

1 Western Branch data omitted due to severe winterkill.

2 Denotes lines dropped from breeding program following 1984 season.

8500096

U. S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
LIVESTOCK, MEAT, GRAIN AND SEED DIVISION  
BELTSVILLE, MARYLAND 20785

EXHIBIT C  
(Wheat)

## OBJECTIVE DESCRIPTION OF VARIETY

WHEAT (TRITICUM SPP.)

INSTRUCTIONS: See Reverse.

NAME OF APPLICANT(S) Ohio State University,  
Ohio Agricultural Research and Development Center  
ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)

1680 Madison Avenue  
Wooster, OH 44691

FOR OFFICIAL USE ONLY

PVPO NUMBER

8500096

VARIETY NAME OR TEMPORARY DESIGNATION

Place the appropriate number that describes the varietal character of this variety in the boxes below.  
Place a zero in first box (e.g.,  or ) when number is either 99 or less or 9 or less.

## 1. KIND:

1 = COMMON    2 = DURUM    3 = EMMER    4 = SPELT    5 = POLISH    6 = POULARD    7 = CLUB

## 2. TYPE:

1 = SPRING    2 = WINTER    3 = OTHER (Specify) \_\_\_\_\_  1 = SOFT    2 = HARD    3 = OTHER (Specify) \_\_\_\_\_

1 = WHITE    2 = RED    3 = OTHER (Specify) \_\_\_\_\_

## 3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

FIRST FLOWERING     LAST FLOWERING

## 4. MATURITY (50% Flowering):

NO. OF DAYS EARLIER THAN .....  1 = ARTHUR    2 = SCOUT    3 = CHRIS  
 NO. OF DAYS LATER THAN .....  4 = LEMHI    5 = NUGAINES    6 = LEEDS

## 5. PLANT HEIGHT (From soil level to top of head):

CM. HIGH  
 CM. SHORTER THAN .....  1 = ARTHUR    2 = SCOUT    3 = CHRIS  
4 = LEMHI    5 = NUGAINES    6 = LEEDS

## 6. PLANT COLOR AT BOOTING (See reverse):

1 = YELLOW GREEN    2 = GREEN    3 = BLUE GREEN

## 7. ANTHUR COLOR:

1 = YELLOW    2 = PURPLE

## 8. STEM:

Anthocyanin: 1 = ABSENT    2 = PRESENT     Waxy bloom: 1 = ABSENT    2 = PRESENT  
 Hairiness of last internode of rachis: 1 = ABSENT    2 = PRESENT     Internodes: 1 = HOLLOW    2 = SOLID  
 NO. OF NODES (Originating from node above ground)     CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

## 9. AURICLES:

Anthocyanin: 1 = ABSENT    2 = PRESENT     Hairiness: 1 = ABSENT    2 = PRESENT

## 10. LEAF:

Flag leaf at booting stage: 1 = ERECT    2 = RECURVED    3 = OTHER (Specify): \_\_\_\_\_  Flag leaf: 1 = NOT TWISTED    2 = TWISTED  
 Hairs of first leaf sheath: 1 = ABSENT    2 = PRESENT     Waxy bloom of flag leaf sheath: 1 = ABSENT    2 = PRESENT  
 MM. LEAF WIDTH (First leaf below flag leaf)     CM. LEAF LENGTH (First leaf below flag leaf)

## 11. HEAD:

☐ 2 Density: 1 = LAX 2 = DENSE
 ☐ 1 Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE  
 4 = OTHER (Specify) \_\_\_\_\_

☐ 2 Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

☐ 2 Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED  
 5 = BROWN 6 = BLACK 7 = OTHER (Specify): \_\_\_\_\_

☐ 8. ☐ 5 CM. LENGTH
 ☐ 1 ☐ 2 MM. WIDTH

## 12. GLUMES AT MATURITY:

☐ 3 Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.)  
 3 = LONG (CA. 9 mm.)
 ☐ 2 Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.)  
 3 = WIDE (CA. 4 mm.)

☐ 2-4 Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED  
 4 = SQUARE 5 = ELEVATED 6 = APICULATE
 ☐ 1 Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

## 13. COLEOPTILE COLOR:

☐ 3 1 = WHITE 2 = RED 3 = PURPLE

## 14. SEEDLING ANTHOCYANIN:

☐ 1 1 = ABSENT 2 = PRESENT

## 15. JUVENILE PLANT GROWTH HABIT:

☐ 1 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

## 16. SEED:

☐ 1 Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL
 ☐ 1 Check: 1 = ROUNDED 2 = ANGULAR

☐ 2 Brush: 1 = SHORT 2 = MEDIUM 3 = LONG
 ☐ 1 Brush: 1 = NOT COLLARED 2 = COLLARED

☐ 2 Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN  
 4 = BROWN 5 = BLACK

☐ 3 Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) \_\_\_\_\_

☐ 0 ☐ 6 MM. LENGTH
 ☐ 0 ☐ 3 MM. WIDTH
 ☐ 3 ☐ 0 GM. PER 1000 SEEDS

## 17. SEED CREASE:

☐ 1 Width: 1 = 60% OR LESS OF KERNEL 'WINOKA'  
 2 = 60% OR LESS OF KERNEL 'CHRIS'  
 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'
 ☐ 3 Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT'  
 2 = 35% OR LESS OF KERNEL 'CHRIS'  
 3 = 50% OR LESS OF KERNEL 'LEMHI'

## 18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 2 STEM RUST (Races) 151
 ☐ - LEAF RUST (Races) See Exhibit B
 ☐ 0 STRIPE RUST (Races)
 ☐ 2 LOOSE SMUT

☐ - POWDERY MILDEW See Exhibit B
 ☐ 0 BUNT
 ☐ 2 OTHER (Specify) Wheat Spindle Streak Mosaic Virus

## 19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 0 SAWFLY
 ☐ 0 APHID (Bydv.)
 ☐ 0 GREEN BUG
 ☐ 1 CEREAL LEAF BEETLE

☐ OTHER (Specify) \_\_\_\_\_
 HESSIAN FLY RACES:
 ☐ 2 GP
 ☐ 1 A
 ☐ 1 B
 ☐ 1 C

☐ 1 D
 ☐ E
 ☐ F
 ☐ G

## 20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Ruler	Seed size	Ruler
Leaf size	Ruler	Seed shape	Ruler
Leaf color	Ruler	Coleoptile elongation	Ruler
Leaf carriage	Logan	Seedling pigmentation	Titan

## INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggles and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

Exhibit DAdditional Description of the Variety

Anthers of Adena frequently exhibit purpling (anthocyanin) by the second day following extrusion, however, this trait appears to be weather dependant. (Item 7, Exhibit C)

Auricles of Adena frequently exhibit a trace of anthocyanin under certain growth conditions, but not under all conditions. (Item 9, Exhibit C)

No hairs are normally found on the flag leaf sheath of Adena plants, however hairs are prevalent on the sheath of the first leaf below the flag leaf. (Item 10, Exhibit C)

Glume shoulders range from oblique to rounded to square in heads of Adena, often within the same head. (Item 12, Exhibit C)

Quality Evaluation of Adena  
(Data taken from USDA Soft Wheat  
Quality Laboratory Reports)

In evaluations of composite samples of 16 varieties and lines grown at 7 locations in Ohio in 1983, Adena was used as the standard (value set at 100) for comparison. Only one entry, an experimental line designated OH 260, surpassed the standard in both milling and baking quality. (Table 1, attached)

In evaluations of composite samples of 15 varieties and lines grown at 7 locations in Ohio in 1982, Roland was used as the standard. Only two lines exceeded this standard. These were OH 260 and Adena. (Table 2, attached - Adena designated as OH 188 in this table.)

In evaluations of composite samples of 32 lines and varieties grown in the Uniform Eastern Soft Red Winter Wheat Nursery in 1982 at 11 locations throughout the Eastern U.S., Adena ranked 9th overall in combined quality score and ranked even higher in this nursery in 1981 and 1980 (Tables 3 and 4, attached). Adena was not grown in this nursery in 1983.

Table 1. Wheat, milling, and flour analytical and baking data, and quality scores. Drill plot entries from Wooster, Ohio, 1983 crop.

LAB NO.	ENTRY	MILLING QUALITY SCORE	BAKING QUALITY SCORE	COMBINED QUALITY SCORE	MILLAB. SCORE	TEST WT. KG/HL	WHEAT PROT. %	WHEAT ASH %	PSI %	ESI %	RED PASS	BREAK FLOUR YIELD	FLOUR YIELD	FRIAB. %
107 10	OH260	103.8A	100.3A	100.3A	117.8	78.9	10.4*	1.6	38.6	9.1	8	31.9*	76.8	28.1
***	STANDARD	100 A	100 A	100 A	103.7	77	9.6	1.53	40.2	11.7	8	33.9	75.4	27.1
096 3	ADENA	100 A	100 A	100 A	103.7	77	9.6	1.53	40.2	11.7	8	33.9	75.4	27.1
110 13	OH285	105 A	98.3 B	98.3 B	119.1	78.3	9.8	1.62	37.4*	9	8	30.7*	76.6	28.1
103 2	OH244	107.6A	97.3 B	97.3 B	117.8	77.5	9.3	1.53	38.7	9.1	8	34.1	77	28.5
***	BENCHMARK	104.8A	96.2 B	96.2 B	112.5	79.3	9.6	1.45	39.2	10.4	8	35	76.6	27.6
109 12	OH265	94.5 C	94.2 C	94.2 C	90.5 *	77.3	9.2	1.69	44.1	12.1	8	38.3	74.5*	26.3
111 15	OH286	92.5 C	92.4 C	92.5 C	87.9 *	76.3	9.3	1.69	45.2	12.3	8	39	74.4*	26.3
101 4	OH234	92 C	93 C	92 C	87.1 *	76.3	9.1	1.67	46	12.4	9	38.4	74.5*	25.3
105 8	OH256	90.5 C	89.8 D	89.8 D	95.7	76.5	9.7	1.64	38.2*	11.6	8	33.7	74.9	26.6 *
102 6	OH235	93.2 C	90.5 C	90.5 C	91.4 *	76.8*	10.3*	1.65	40	12.7	8	34.6	73.5Q	25.9
097 11	HART	89.7 D	88.2 D	88.2 D	96.4	77.3	10.3*	1.64	46.9	11.8	9	35.4	75.4	26.4
100 1	OH220	94.3 C	86.9 B	87.1 D	80.2 Q	75.7*	9.5	1.65	44.7	13.6*	9	39.3	73.8*	25.4
108 16	OH262	87.1 D	85.7 D	85.7 D	90.5 *	76.7	9.6	1.65	39.7	12.9*	8	36.6	73.9*	25.9
098 5	TITAN	91.8 C	79.9 F	79.9 F	108.2	77	9	1.5	39.1	11.6	8	34.8	75.6	27.8
099 14	TYLER	102.7A	87.1 D	87.1 D	79.1 Q	78.2	10.8Q	1.71*	36.4Q	13.8*	9	31.7*	72.7Q	24
104 7	OH255	78.8 F	74 F	74 F	96.9	78.3	10.8Q	1.74*	33.5Q	12	8	29.8Q	75.2	26.4
106 9	OH257	86.8 D	74 F	74 F	96.9	78.3	10.8Q	1.74*	33.5Q	12	8	29.8Q	75.2	26.4

# STRAIGHT-GRADE FLOUR

LAB NO.	PROT. %	ASH %	ADJ. VISC.	MICRO AWRC %	COOKIE DIAM. CM.	TOP GRAIN
107	9.1	.36	67	47.7	18.67	7
***	7.8	.36	91	48.8	18.31	7
096	7.8	.36	91	48.8	18.31	7
110	8.5	.35	55	49.1	18.7	7
103	7.8	.37	10	48.5	18.21	6
***	8.5	.36	85	50.6*	18.57	3*
109	7.7	.40	97	51.5*	18.25	6
111	7.8	.41Q	11	51.4*	18.17	6
101	7.4	.40	82	51.5*	18.12	6
105	8.6	.37	97	50.1	18.32	6
102	8.1	.39*	59	49.4	18.06*	7
097	8.6	.36	78	50.7*	18.22	6
100	9	.39*	91	52.3Q	18.26	5
108	7.8	.41Q	10	50.6*	18.25	6
098	8.4	.37	84	51.3*	18.08	6
099	7.6	.35	13	50.8*	17.69Q	5
104	9.3	.37	73	49.6	18.22	6
106	9	.38*	70	50.4*	17.85*	6

8500096



Table 2. Wheat, milling, and flour analytical and baking data, and quality scores, Drill Plot entries from Wooster, Ohio, 1982 crop.

LAB NO.	ENTRY	MILLING QUALITY SCORE	BAKING QUALITY SCORE	COMBINED QUALITY SCORE	MOIS. WT. PCT.	TEST KG/HL	PROT. PCT.	ASH PCT.	WHEAT PART. INDEX PCT.	ENDOSP. SEPN. INDEX PCT.	RED. PASS	BREAK FLOUR YIELD PCT.	FLOUR YIELD PCT.	MILLAB. SCORE
WOOSTER, OHIO														
MILLING STD. = 82002 - ROLAND														
BAKING STD. = 82002 - ROLAND														
82001	4 HART	96.5 B	82.2 E	82.2 E	10.4	80.0	10.3	1.58	36.7	12.2	9.	29.3	74.3*	99.2
82002	6 ROLAND	100.0 A	100.0 A	100.0 A	10.3	80.2	10.2	1.62	38.1	11.3	9.	30.1	75.8	102.4
82003	9 TITAN	97.7 B	81.7 E	81.7 E	10.1	78.8*	9.6	1.58	35.9*	11.4	9.	31.9	74.7*	99.4
82004	25 TYLER	106.9 A	88.0 D	88.0 D	10.4	78.9*	9.7	1.49	37.1	10.9	9.	31.0	75.6	113.7
82005	10 OH189	103.2 A	100.1 A	100.1 A	10.3	77.90	9.7	1.45	38.3	11.0	9.	30.6	75.7	109.8
82006	12 OH220	99.8 B	78.3 F	78.3 F	10.4	79.2*	11.0*	1.61	47.1	12.8*	11.	33.5	75.7	104.1
82007	14 OH234	99.5 B	105.0 A	99.5 B	10.3	77.10	9.5	1.55	41.5	11.6	10.	34.0	74.6*	97.3
82008	15 OH235	95.4 B	97.4 B	95.4 B	10.0	76.90	9.9	1.54	37.6	11.4	9.	30.1	74.5*	96.2
82009	17 OH244	112.4 A	92.3 C	92.3 C	10.1	80.1	10.3	1.45	36.4	9.1	9.	27.9*	77.3	126.5
82010	19 OH255	84.2 E	72.4 F	72.4 F	10.3	79.6	11.1*	1.60	35.2*	14.00	10.	27.5*	73.40	85.4
82011	20 OH256	102.4 A	86.0 D	86.0 D	10.4	78.9*	10.6	1.58	38.1	11.9	10.	30.3	74.7*	101.5
82012	21 OH257	102.4 A	76.3 F	76.3 F	10.6	80.7	10.4	1.67	35.3*	10.7	9.	27.7*	75.9	111.2
82013	22 OH260	110.9 A	105.8 A	105.8 A	10.2	80.2	10.4	1.55	39.7	8.9	9.	31.8	76.9	119.8
82014	23 OH265	96.1 B	90.0 C	90.0 C	10.2	79.4*	10.0	1.60	37.9	12.9*	9.	36.1	74.3*	95.5
82015	PIONEER X669D	101.3 A	84.0 E	84.0 E	9.6	80.9	10.7	1.45	39.9	11.5	10.	32.1	75.3	104.5
	STANDARD	100.0 A	100.0 A	100.0 A	10.3	80.2	10.2	1.62	38.1	11.3	9.	30.1	75.8	102.4

## STRAIGHT-GRADE FLOUR

LAB NO.	MOIS. PCT.	ASH PCT.	PROT. PCT.	VISC. AS IS MACH.	VISC. ADJ. MACH.	MICRO AMRC PCT.	COOKIE DIAM. CM.	TOP GRAIN
82001	14.2	38	9.0	57	73	54.00	17.8*	5.
82002	13.7	41	8.9	67	93	50.2	18.1	7
82003	13.9	39	8.4	49	79	52.5*	17.60	7
82004	13.8	36	8.1	69	121*	51.0	17.7*	7
82005	13.7	38	8.2	52	87	50.2	18.0	7
82006	14.0	39	10.10	94	89	54.60	17.60	5
82007	13.8	40	8.1	44	78	50.8	18.1	8
82008	13.9	40	8.7	37	59	50.7	19.0	6
82009	14.1	37	9.2	67	82	50.4	17.9	6
82010	14.1	39	9.9*	70	70	52.3*	17.40	6
82011	13.9	38	9.5*	61	92	51.2	17.7*	6
82012	14.2	39	9.0	49	61	51.9*	17.40	4*
82013	14.2	39	9.2	61	76	49.5	18.2	7
82014	14.1	38	8.8	62	87	51.4	17.8*	6
82015	13.8	39	9.6*	74	79	52.9*	17.7*	5
	13.7	41	8.9	67	93	50.2	18.1	7

Table 3. Ranking of Uniform Eastern Soft Red Winter Wheat Nursery entries according to combined quality scores, 1982 crop, and rankings for 1977-1981 crops.<sup>a</sup>

Lab. No.	Entry	Ranking According to Combined Quality Score					
		1982	1981	1980	1979	1978	1977
82302	Knox 62 <sup>b</sup>	1	9	11	9	3	4
326	IN74141A-10-5-4-2	2					
306	OH234	3	19				
330	Pioneer W4034D	4					
322	MI B6310	5					
312	Scotty	6	17				
320	Severn	7					
308	OH236	8	29				
305	OH188	9	5	5			
323	IL79-1116	10					
324	IN65309C1-1812-3-2	11					
307	OH235	12	31				
313	MO W9785	13	26				
317	Massey	14					
321	MD55-286-21	15					
304	Fillmore	16	10	10			
329	Voris V7070	17					
303	Oasis	18	25	22	17	8	15
319	WI X1372-2	18					
309	AR48-7-4	20	22				
311	IL77-2656	21	16	21			
327	AR116-10	22					
314	MO W9725	23	24				
315	MO W9862	24	27	32			
301	Trumbull	25	33	29	22	26	24
316	PA345	26	30	25			
325	IN6728A3-22-4-2-1-2	27					
332	Callahan 238	27					
331	NAPB 316A-78	29					
328	Coker 79-16	30	23				
310	AR155-19-4	31	14				
318	VA79-54-254	32					

<sup>a</sup> With cake flour data.

<sup>b</sup> Standard.

Table 4. Wheat, milling, and flour analytical and baking data, and quality scores, Uniform Eastern Soft Red Winter Wheat Nursery entries, 1982 crop (with cake data).

LAB NO	ENTRY	MILLING QUALITY SCORE	BAKING QUALITY SCORE	COMBINED QUALITY SCORE	MOIS PCT	TEST WT. KG/HL	PROT. PCT	ASH PCT	WHEAT PART. SIZE INDEX PCT	ENDOSP. INDEX PCT	RED. PASS	BREAK FLOUR YIELD PCT	FLOUR YIELD PCT	MILLAB. SCORE
UNIF. EAST. RED WRS. WITH CAKE DATA														
MILLING STD. = 82302 - KNOX 62														
BAKING STD. = 82302 - KNOX 62														
82301	TRUMBULL	92.8 C	84.5 E	84.5 E	9.9	79.4	11.8	1.64	37.7*	13.1	11.	28.8Q	75.1	96.3
82302	KNOX 62	100.0 A	100.0 A	100.0 A	10.2	79.7	11.6	1.70	40.2	12.2	11.	32.6	75.4	104.0
82303	OASIS	97.2 B	90.0 C	90.0 C	10.2	81.1	12.0	1.64	39.5	11.9	10.	29.4Q	75.6	101.1
82304	FILLMORE	104.0 A	91.1 C	91.1 C	10.0	80.2	11.5	1.58	36.5Q	10.2	11.	29.7*	77.2	115.1
82305	CH186	101.7 A	93.4 C	93.4 C	10.1	78.4*	11.3	1.50	37.4*	10.9	11.	29.8*	76.8	110.3
82306	CH234	98.2 B	103.1 A	92.4 C	10.0	75.8Q	10.4	1.58	40.4	10.9	9.	33.5	73.3	100.4
82307	CH235	93.4 C	92.4 C	92.4 C	10.0	77.8Q	11.3	1.62	36.6Q	10.9	9.	28.7Q	75.4	97.5
82308	CH236	93.5 C	98.7 B	93.5 C	9.9	77.3Q	11.0	1.57	38.3*	11.8	9.	32.3	74.4*	94.2
82309	AR48-7-4	100.0 A	88.7 D	88.7 D	10.2	78.7*	11.5	1.57	35.8Q	10.7	9.	28.2Q	73.9	110.4
82310	AR155-19-4	102.1 A	79.0 F	79.0 F	10.4	81.9	11.7	1.69	44.7	11.0	10.	33.9	75.4	103.0
82311	ILL77-2855	102.2 A	87.0 D	87.0 D	10.3	82.0	11.1	1.62	40.5	11.3	10.	31.3	74.2	103.1
82312	SCOTT	95.3 B	98.1 B	95.3 B	9.9	78.9*	11.9	1.63	37.3*	11.0	10.	27.4Q	76.3	102.1
82313	MON9785	93.4 C	91.4 C	91.4 C	9.9	78.3*	11.0	1.70	38.1*	10.8	9.	28.8Q	76.0	93.5
82314	MON9725	105.7 A	85.0 D	85.0 D	10.1	81.0	10.5	1.48	41.5	11.8	10.	33.9	76.1	107.6
82315	MON98A2	98.3 B	84.9 E	84.9 E	10.3	81.8	11.7	1.56	42.2	12.0	10.	33.3	75.2	97.2
82316	PA345	96.0 B	83.4 E	83.4 E	10.0	77.8Q	11.6	1.61	34.4Q	10.4	10.	27.7Q	75.9	106.6
82317	MASSEY	101.7 A	91.3 C	91.3 C	10.0	79.2	11.6	1.67	41.9	10.7	9.	33.1	75.6	105.1
82318	VA79-54-254	108.4 A	76.9 F	76.9 F	10.1	80.6	11.1	1.56	46.1	10.3	11.	36.0	76.8	111.7
82319	NIX1372-2	110.2 A	90.0 C	90.0 C	10.0	78.5*	10.6	1.64	38.3*	8.2	8.	28.3Q	77.5	121.7
82320	SEVERN	113.7 A	94.2 C	94.2 C	10.1	80.1	11.4	1.64	37.5*	7.4	8.	28.3Q	78.3	132.1
82321	ND55-286-21	107.2 A	91.2 C	91.2 C	10.0	77.6Q	10.9	1.58	41.3	10.1	9.	34.0	76.1	113.2
82322	MI R6310	97.4 B	96.9 B	96.9 B	10.1	78.3*	10.6	1.58	33.9Q	10.2	9.	29.5Q	75.5	105.9
82323	IL79-1116	102.4 A	93.3 C	93.3 C	10.2	78.0Q	10.4	1.58	44.9	10.9	10.	34.6	75.9	102.7
82324	IN65309C1-18-2-3	95.1 B	93.0 C	93.0 C	10.0	80.3	11.7	1.63	36.6Q	11.9	9.	29.6Q	74.7	100.5
82325	IN6728A3-22-4-2-1	92.2 C	82.8 E	82.8 E	9.9	79.3	11.3	1.64	38.4	12.7	10.	31.5	76.6	118.6
82326	IN74141A-10-5-4-2	110.8 A	99.4 B	99.4 B	9.9	80.0	11.1	1.60	41.0	9.5	9.	31.5	76.0	107.9
82327	AR116-10	99.3 B	85.2 D	85.2 D	10.0	81.8	12.1	1.68	42.8	9.9	8.	33.5	76.0	107.9
82328	COKE 7916	99.3 B	79.5 F	79.5 F	9.9	80.3	11.7	1.61	37.5*	10.9	9.	28.5Q	76.1	106.6
82329	VORIS V7070	90.6 C	92.6 C	90.6 C	9.8	77.3Q	11.5	1.67	38.7	10.7	9.	32.1	75.1	91.2
82330	FLONOR W 4034D	98.7 B	98.1 B	98.1 B	10.0	77.9Q	11.2	1.53	39.3	11.3	9.	29.8*	74.9	102.3
82331	NAP6 316A-78	96.7 B	81.8 E	81.8 E	10.0	79.6	12.2	1.58	41.0	11.7	8.	31.6	74.9	100.4
82332	CALIFAN 238	101.6 A	82.8 F	82.8 F	9.7	78.4*	10.8	1.59	36.5Q	10.6	8.	28.9Q	76.2	109.4
	STANDARD	100.0 A	100.0 A	100.0 A	10.2	79.7	11.6	1.70	40.2	12.2	11.	32.6	75.4	104.0

Table 4. (contd.). Wheat, milling, and flour analytical and baking data, and quality scores, Uniform Eastern Soft Red Winter Wheat Nursery entries, 1982 crop (with cake data).

LAB NO.	STRAIGHT-GRADE FLOUR				CAKE PATENT FLOUR				INTER-NAL SCORE						
	MOIS. PCT.	ASH PCT.	PROT. PCT.	VISC. AS IS MACH.	VISC. ADJ. MACH.	MICRO COOKIE DIAM. CM.	TOP GRAIN PCT.	ASH PCT.		PROT. PCT.	INIT. PH	FINAL PH	CHLORINE RESPONSE PH/ML/G	OPT. LIQUID VOLUME PCT.	CAKE VOLUME ML.
82301	13.9	40	10.7	97	78	51.1*	17.80	6	30	9.6	4.83	2.31	125	1010.*	84
82302	13.9	38	10.4	84	71	49.2	18.3	6	29	9.5	4.84	2.51	130	1067	83
82303	13.5	40	10.7	114	91*	49.4	17.80	7	30	9.8	4.83	1.90	120	1057	83
82304	13.8	40	10.4	101	87	49.5	17.80	5	27	9.4	4.77	2.09	125	1041	87
82305	14.1	40	10.0	76	74	49.0	17.9*	3.0	29	8.9	4.76	2.13	120	1022.*	85
82306	13.8	41*	9.0	58	77	48.9	18.5	7	33*	8.2	4.80	2.29	120	1054	84
82307	13.8	42*	10.2	51	48	49.1	17.80	5	32*	9.6	4.79	2.18	120	1008.*	87
82308	13.8	40	9.9	38	38	50.4	18.1	5	29	9.1	4.80	2.86	120	1067	85
82309	13.8	38	10.2	99	90*	49.6	17.60	5	29	9.3	4.80	2.98	130	1000.0	88
82310	13.9	40	10.6	108	88	52.80	17.60	3.0	29	9.9	4.74	2.24	120	1022.*	86
82311	13.4	42*	10.1	77	75	49.9	17.60	5	30	9.1	4.62	2.52	125	994.0	85
82312	13.8	42*	10.6	65	55	48.9	18.3	6	31	9.5	4.83	2.38	130	1019.*	87
82313	14.0	450	9.7	74	84	49.6	17.70	6	32*	8.9	4.80	2.39	120	1036	85
82314	13.8	39	9.3	110	133.0	51.5*	17.70	5	30	8.3	4.73	3.70	120	1020.*	86
82315	13.6	41*	10.4	120	106.*	51.4*	17.60	4*	29	9.3	4.81	2.50	120	1072	88
82316	13.6	40	10.5	84	72	51.0*	17.60	4*	30	9.6	4.77	2.47	120	997.0	85
82317	13.9	40	10.4	102	88	49.6	17.50	5	30	9.5	4.83	2.53	120	1069	88
82318	14.2	40	9.9	97	99*	53.70	17.50	3.0	29	8.9	4.69	2.36	130	1017.*	86
82319	14.2	40	9.3	71	86	51.9*	17.80	6	32*	8.4	4.83	2.99	120	1041	90
82320	13.5	38	10.5	79	66	48.8	18.1	6	30	9.7	4.85	2.40	130	996.0	86
82321	13.9	38	9.7	79	82	49.8	17.9*	5	28	8.8	4.75	2.72	125	984.0	87
82322	14.1	40	9.3	32	38	48.7	17.80	5	29	8.4	4.75	2.88	125	1011.*	86
82323	13.9	41*	9.2	72	93*	49.6	17.70	4*	31	8.3	4.78	3.08	125	1041	85
82324	14.0	38	10.6	84	57	50.5	18.1	6	28	9.5	4.81	2.77	120	1043	81
82325	13.9	42*	10.1	113	109*	50.9*	17.50	4*	29	9.0	4.77	2.77	130	1001.0	85
82326	14.1	38	10.3	102	92*	48.1	18.0*	5	28	9.4	4.78	3.18	120	1057	84
82327	13.7	40	10.9	119	90*	50.5	17.50	2.0	29	10.2*	4.81	3.26	120	1025.*	87
82328	13.7	40	10.5	114	96*	51.5*	17.20	2.0	30	9.4	4.84	2.95	120	1023.*	84
82329	14.0	440	10.5	94	82	49.0	17.80	3.0	33*	9.6	4.81	2.54	120	1016.*	90
82330	14.0	39	10.1	91	85	48.0	17.9*	5	28	9.2	4.79	2.81	120	1032.*	86
82331	13.9	39	10.8	126	99*	50.6	17.40	4*	27	9.7	4.77	3.43	120	1011.*	83
82332	13.9	40	9.5	102	115*	51.0*	17.50	3.0	29	8.8	4.71	3.38	120	983.0	87
82333	13.9	38	10.4	84	71	49.2	18.3	6	29	9.5	4.84	2.51	130	1067	83